

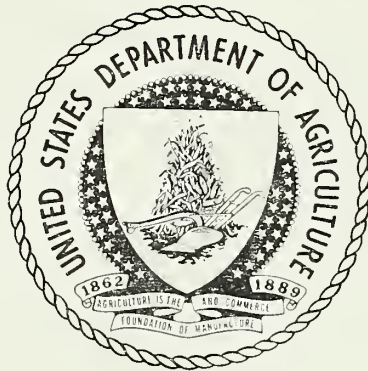
Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

A47
In2

AD-33 Bookplate
(5-61)

UNITED STATES
DEPARTMENT OF AGRICULTURE
LIBRARY



BOOK NUMBER A47
17263 In2

Restricted
Not for Publication

*Mrs. Goss
Library*

Report of
Research Committee Meeting of the
Institute of American Poultry Industries
at the
Western Regional Research Laboratory*

Wednesday, June 27, 1951

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY
FEB 19 1963
C & R-PREP.

Outline of Report

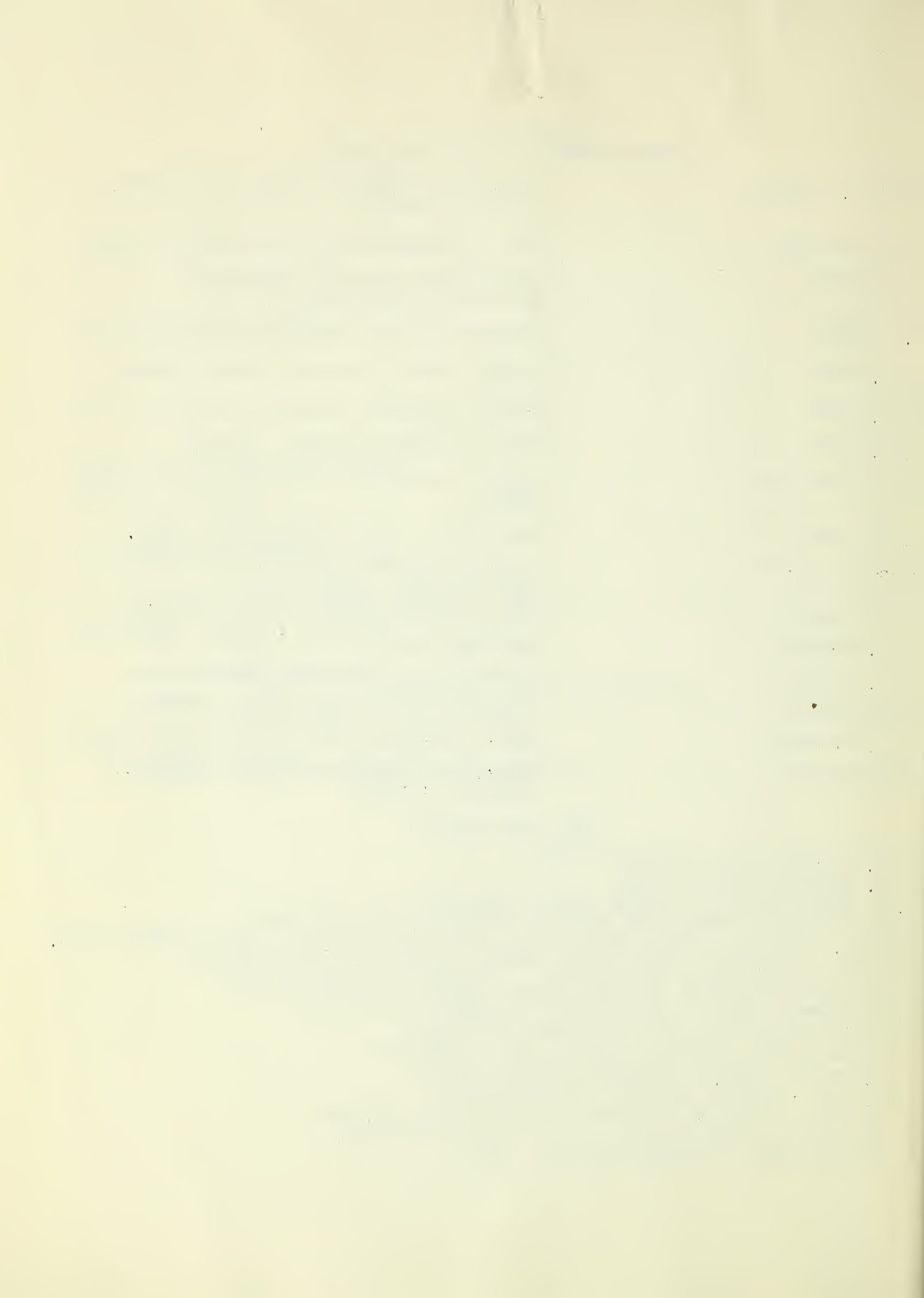
	<u>Page</u>
Attendance list	1
Agenda	2
Questions submitted by WRRL	3-4
Introduction to report	5
Salmonella	5-6
Egg washing	7-8
Shelf-life of ice packed poultry	8
Feather utilization	8
Discussion of questions on eggs	9-10
Discussion of questions on poultry	10-12
Addendum	
Research programs on poultry and egg processing and utilization at WRRL	12-13
Publications on poultry and eggs - 1950-51	13-16

Research Committee Members and Guests

Cliff D. Carpenter	Institute of American Poultry Industries, Chicago, Illinois
D. S. DeForest	Swift & Company, South San Francisco, Calif.
H. C. Diehl	Refrigeration Research Foundation, Colorado Springs, Colorado
P. E. Howe	Bureau of Animal Industry, Washington, D. C.
A. C. Keith	Seymour Packing Company, Topeka, Kansas
R. W. Kline	Armour & Company, Chicago, Illinois
C. H. Koonz	Swift & Company, Chicago, Illinois
Hans Lineweaver	Western Regional Research Laboratory, Albany, Calif.
F. W. Lorenz	University of California, Davis, Calif.
Alyce W. Lowrie	Poultry Producers of Central California, San Francisco, Calif.
J. R. Redditt	Cudahy Packing Company, Omaha, Nebraska
H. M. Slosberg	Henningsen-Lamesa, Inc., Lamesa, Texas
G. F. Stewart	University of California, Davis, Calif.
W. H. Tonkin	Standard Brands, Kansas City, Missouri
B. G. Vant Hof	Swift & Company, South San Francisco, Calif.
Jane Wasmuth	Institute of American Poultry Industries, Chicago, Illinois

WRRL Staff Members

G. H. Brother, Head, Protein Division
M. J. Copley, Director, WRRL
J. G. Davis, Chemist, Poultry Products Division
R. E. Feeney, In Charge, Egg Section, Poultry Products Division
Helen L. Hanson, In Charge, Utilization & Appraisal Section, Poultry Products Div.
Leo Kline, In Charge, Microbiology Section, Poultry Products Division
A. A. Klose, In Charge, Poultry Section, Poultry Products Division
C. H. Kunsman, Head, Physicochemical & Analytical Division
Hans Lineweaver, Head, Poultry Products Division
L. R. MacDonnell, Chemist, Poultry Products Division
E. P. Mecchi, Chemist, Poultry Products Division
M. F. Pool, Chemist, Poultry Products Division
L. W. Shaw, Economist, Engineering & Development Division
R. P. Straka, Microbiologist, Poultry Products Division
W. B. Van Arsdel, Assistant Director, WRRL



Research Committee Meeting of the
Institute of American Poultry Industries
at the
Western Regional Research Laboratory
Wednesday, June 27, 1951

9:00 a.m.	Welcome	M.J. Copley
9:15 a.m.	Plan of Conference	Cliff D. Carpenter
9:30 a.m.	Report on Salmonella Literature Survey	I-API (Kline & Loy)
10:00 a.m.	Salmonella as Viewed by WRRL	
10:30 a.m.	The Latest in Egg Washing	Fred Lorenz
11:00 a.m.	Recess	
11:10 a.m.	Questions on Egg Problems	
12:15 p.m.	Adjourn for Lunch	
1:45 p.m.	Problems in Shelf-Life of Ice Packed Poultry	I-API (Koonz)
2:15 p.m.	Space Reserved for Recently Encountered Problems	I-API
3:00 p.m.	Questions on Poultry Problems and on Egg Problems, if time permits	
4:00 p.m.	Recess	
4:30 p.m.	Summarizations: Fresh Poultry Frozen Poultry Shell Eggs Frozen Eggs Dried Eggs	C.H. Koonz H.C. Diehl W.C. Loy R. Kline A.C. Keith G.F. Stewart
5:00 p.m.	Adjourn	
5:30 p.m.	Refreshments	
7:30 p.m.	Group Dinner	

Questions Submitted by WRRL

EGGS

MICROBIOLOGY (C.H. Koonz and G.F. Stewart)

Is the new enzyme process the solution to the problem of fermenting egg white and whole egg?

What does it cost to pasteurize?

Is there any other way than pasteurization to eliminate Salmonella?

DRIED EGGS (Ralph Kline)

Are there any questions about dried whole egg?

Is it possible, though perhaps not practical, to make an all-purpose dried white?

Is greater stability needed for dried egg yolk?

SHELL EGGS (W.C. Loy and Paul Howe)

What is relative importance of microbial and nonmicrobial shell egg deterioration?

Does flash heating of eggs, especially immediately following washing, have any possibilities?

Does the composition of the warehouse atmosphere affect the stability of stored eggs?

Are there any deleterious effects of oiling eggs?

FROZEN AND LIQUID EGG (A.C. Keith and G.F. Stewart)

What sort of standards if any, are needed for frozen eggs and what kind of research is needed to establish them?

What is wrong with concentrated egg?

BY-PRODUCTS (Ralph Kline)

What problems are encountered by industry in the disposition of inedible egg products, especially technical albumin?

POULTRY

MICROBIOLOGY (C.H. Koonz)

Should in-plant chlorination be used and how much is it used?

Is there a health hazard in the distribution of fresh cut-up poultry?

Is Staphylococcal enterotoxin a recognized problem in poultry, especially turkey?

Newcastle in humans?

POULTRY MEAT FLAVOR AND PREFERENCE (W.C. Loy and Paul Howe)

Are hormonized birds preferred in comparison with their sisters?

Are birds treated with MSG preferred?

Should MSG be in the bird or in the recipe?

What is origin of poultry flavor?

FROZEN STORAGE OF POULTRY (H.C. Diehl)

How prevalent are "blue" birds?

How much of poor storage stability is due to improper finish (early marketing), poor prefreezing handling practice, inadequate packaging, and poor storage temperature control?

FEATHER REMOVAL

What are effects of various temperatures on meat appearance, storage stability, acceptability and cost? (H.C. Diehl)

What information is available from industry (and the literature) on the actual force required to pull out feathers of 126 and 140° scalded birds compared with unscalded birds? (A.C. Keith)

BY-PRODUCTS (W.C. Loy)

What are the potential outlets for stable turkey fat?

Is the industry satisfied with present outlets for viscera, heads, and feet?

Introduction to Report

This report will follow the agenda rather closely. However, since several members of the Research Committee expressed a desire for more information on the research activities at WRRL, an addendum has been attached which gives by subject the kinds of research under way and which gives by title and reference the scientific publications that have appeared since January 1950 and those which are expected to appear by December 1951. The research staff at WRRL would appreciate any comments that members of the Research Committee might care to make regarding the research subjects or the published work.

Certain valuable discussions are not recorded in the following report. These were the discussions that occurred in small informal groups that assembled and exchanged ideas and information from 5:20 p.m. until 10:00 p.m.

We are very grateful to Mrs. Alyce Lowrie for making available to us her very extensive notes of the proceeding of the meeting. We have used them quite freely.

Salmonella

Following Dr. Copley's welcome and Dr. Carpenter's outline of the conference plans, Dr. Carpenter introduced the discussion of Salmonella by stating that, in his opinion, Salmonella may occupy the top spot researchwise in the egg and poultry industries for the next several years. The fear of adverse repercussions from scare headlines soft-pedals unnecessary publicity. Industry operations must keep pace with research findings; new methods, however, must be practical and have permanent or long-range value.

Dr. Ralph Kline of Armour reviewed Salmonella literature pertaining to the potential health hazard resulting from the occurrence of Salmonella in eggs. Because the source of food poisoning is often unidentifiable by the time outbreak occurs, it is difficult to isolate the causative organism. One definite instance of Salmonella poisoning occurred on shipboard and was directly traceable to shell eggs. (Dr. Carpenter referred to an outbreak of Salmonellosis at Mt. Sinai Hospital which was traced to the eating of uncooked, dried egg white.) Many types of Salmonella have been isolated from some 25,000 samples of shell eggs taken at all stages between the farm and the consumer.

The percent S. pullorum-infected eggs from reacting hens varies from 5 to 22 percent (latter exceptionally high); usual range is from 5 to 6 percent. S. pullorum is not found in eggs from non-pullorum-reacting hens.

Eggs from hens with ovarian pullorum infection are not always infected. The percentage of shell-surface infection is greater among eggs from soiled nests and among dirty eggs than clean. Salmonella will penetrate the shell.

In dried whole eggs, the incidence of infection ranges as high as 35 percent. Fifty-two types of Salmonella have been isolated in dried whole eggs. These organisms spread freely in liquid egg-meats.

It is not established whether Salmonella species other than pullorum enter the egg via the ovary of the hen.

The attitude of the industry toward the occurrence of Salmonella organisms in egg meat was clearly indicated. Producers and processors are energetically trying and will continue to attempt to minimize infection in poultry flocks and in pockets of contamination in the processing procedures. However, industry has naturally been reluctant to modify their present processing procedures for liquid eggs, either by pasteurization or other means until the values and hazard of the modified methods have been adequately assessed. It was apparent that some processors felt the health hazard represented by the Salmonella organisms was insufficient to require modified processing procedures other than more strict sanitary control.

The ultimate industry goal should be to eliminate Salmonella-infected eggs at their source. Any other interim measures (pasteurization, etc.) that are found to be practical should be encouraged and adopted.

Dr. Carpenter raised a question as to whether anyone knew of work on the development of polyvalent antigens as a means of controlling *S. pullorum* and other species of the same immunological group, in particular *S. gallinarum*. It was mentioned that Dr. Pomeroy at Minnesota might possibly be studying this subject.

Mr. Redditt asked: "Are there geographical variations in Salmonella infection?"

Dr. Carpenter replied that New England has virtually eliminated pullorum infection from its breeding flocks - present occurrence probably less than 0.03 percent, compared with 1 to 2 percent in the midwest.

Dr. Koonz questioned the practicability of pasteurization because of the prejudice among bakers toward pasteurized frozen eggs.

Dr. Koonz questioned whether Salmonella would ever be eliminated from foods. It was suggested that a practical solution to the Salmonella problem might be to educate the consumer to use cooking or preparation techniques that will destroy these organisms. Raw eggs are considered by some to be a dangerous food.

Dr. Howe submitted that eggnogs should not be used by State Institutions on the basis of bacterial infection and that the formerly alleged digestibility of raw eggs was a fallacy. He also pointed out that directions to institutions can be worded so proper cooking requirements become a matter of course.

The general view as evident in the attendant discussion was that Salmonella in poultry meat does not constitute a health hazard as present methods of cooking are quite adequate to destroy these organisms. A recent report in the literature claiming that the heat treatment, by standard cooking methods, of poultry meat inoculated with Salmonella organisms did not destroy these organisms was considered highly unreliable because of the methodology used.

Dr. Lineweaver stated that Salmonella interests at the WRRL are immediately concerned with the practicability and effectiveness of processing steps that can be taken now or in the near future. Research activities under way concern: (1) Improvement of methods for detecting and counting Salmonella in eggs and egg products (RMA Contract - Iowa State); (2) Determination of the incidence and significance of Salmonella and other pathogens as they occur at various stages of the poultry processing line (RMA Contract - University of Nebraska Medical School); (3) Thermal death time studies at WRRL; and (4) Informal cooperation with Dr. Goresline on the determination of functional properties of several samples of commercially pasteurized egg.

Egg Washing

Dr. Lorenz discussed at some length developments in egg washing. His comments chiefly concerned his recent researches. He reported immersing eggs for five minutes in water of the same temperature as the interior of the egg, with no resultant *Pseudomonas* infection of the eggs. When the temperature of the water was 1° below the interior temperature of the egg, there was 20 percent spoilage and as the temperature differential increased, there was a rapid increase in the percentage of spoilage.

According to Dr. Lorenz, under laboratory conditions, it is fairly easy to wash eggs without consequent spoilage, when the water and the washing device are clean and the temperature of the water exceeds the temperature of the egg. He reported sampling eggs from two ranches - No. 1 having had no history of *Pseudomonas* spoilage and No. 2 having had a bad spoilage history. When eggs from both ranches were washed at the former, there was no spoilage; when eggs from both ranches were washed at the latter, there was approximately 14 percent spoilage in both; when eggs from both sources were washed at the Petaluma egg packing plant, there was approximately 3-1/2 percent spoilage in both samples; when eggs from both ranches were washed at the Poultry Husbandry Laboratory in Davis, there was no spoilage in either sample. Thus, it appears that spoilage may be directly traced to improper washing methods. When reasonably clean eggs, at a temperature at which they are usually gathered from the nest, were washed with tap water the spoilage approximated 6 percent. Dr. Lorenz summarized the following complicating factors in the study of egg washing problems: (1) The slight incidence of *Pseudomonas* infection among unwashed clean and light dirty eggs; (2) the slight *Pseudomonas* contamination from infected nesting materials; (3) the fact that eggs, coming out of a washer utilizing quite warm water, may start to cool while their shell surfaces are still moist--thus absorbing *Pseudomonas* bacteria (some washers are now equipped with warm air dryers); (4) the use of a liquid disinfectant applied to eggs subsequent to the washing process is ineffective in combating *Pseudomonas* infection; (5) there are technical differences in strain virulence, although the strains are superficially similar.

Dr. Carpenter solicited comments from industry representatives on problems encountered in the washing of eggs. No problems were reported by Swift, Armour or Cudahy representatives. Mrs. Lowrie outlined the clean-egg program of Poultry Producers of Central California, under which producers receive a premium of 45¢ per case for deliveries of clean, unwashed eggs, derived from assessments on deliveries of washed and/or dirty eggs. According to Mrs. Lowrie, membership response to Poultry Producers' educational work, aimed at a high and increasing percentage of clean egg production, has been good. Currently, approximately 60 percent of members' present egg deliveries are clean, unwashed. There is ample evidence that producers in Central California can average 90 percent clean-egg production the year round, with various types of housing and nest arrangement, provided that sound management practices are rigidly followed. This association is recommending the dry cleaning of heavy dirties, and has discontinued washing in favor of dry cleaning methods in its own packing plants. In its educational program, Poultry Producers has emphasized the dangers of spoilage resulting (at retail or consumer levels) from *Pseudomonas* infection among current receipts under refrigerated conditions - a situation which presents greater hazards to a successful egg merchandising program than spoilage in stored stocks.

Dr. Lorenz reviewed the use of the ultraviolet (black) light in the detection of Pseudomonas infection. Mrs. Lowrie discussed the use of this type of light in the detection of washed eggs. In the former instance, it is used as a candling light; in the latter as a floodlight. According to Dr. Lorenz, the ultraviolet light approaches 100 percent candling accuracy in the detection of Pseudomonas infection in white-shelled eggs. Its percentage accuracy is much lower in the case of brown-shelled eggs; he believes it to be improbable that the latter limitation can be readily overcome.

In a discussion of factors contributing to a high incidence of Pseudomonas infection, it appeared that climate is less important than the practice of washing under normal farm conditions, which may include somewhat less than ideal sanitation, nest, and housing conditions. Since the significance of the Pseudomonas problem has achieved its present proportions within the last four years in Central California, there appears to be correlation with the widespread practice of machine-washing eggs.

There is a strong trend toward dry cleaning (abrasive) methods in California.

Shelf-Life of Ice Packed Poultry

Dr. Koonz spoke on the shelf-life of poultry meat. He stated that in former years, visceral taint and surface appearance were the major factors to be considered in poultry deterioration at the retail store level. Today, methods of store handling have become increasingly significant as the distribution of ice-packed poultry has greatly increased volumewise. The shelf-life of ice-packed poultry is, for the most part, determined by: (1) The sanitation practices of the processor (processing includes dressing, evisceration and ice-packing); and (2) methods of handling by the retailer. The average shelf-life is probably five days from time of processing; one week shelf-life would be very desirable if it could be achieved.

Later, in response to a question on in-plant chlorination, Dr. Koonz stated his feeling that chlorination is unnecessary when good housekeeping practices are followed.

Feather Utilization

Dr. Brother reported that the most important recent developments in possible practical utilization of feathers include: interest in modifying body feathers of turkeys and chickens to make them suitable as extenders of waterfowl down; production of improved paint brush bristles from feathers (by the Rubberset Co.) on a semi-production scale; and the commercial production and marketing at around \$100 per ton of calcined feather meal for fertilizer by at least two concerns, with definite commitment of the Turlock-Modesto group to be in full scale production (about 5 tons of meal per day) before the next turkey season. The Army Quartermaster Corps has expressed interest in the possibility of developing curl in chicken and turkey body feathers so as to increase their bulk factor, hence their heat insulation value, for bedding and arctic clothing for the armed forces.

Discussion of Questions on Eggs

- Question: Is the new enzyme process the solution of the problem of fermenting egg white and whole egg?
- Answer: It was pointed out that the new patented enzyme process is useful for both egg white and whole egg, but industry members generally seemed to have a wait-and-see view of the process. Only Dr. Slosberg of Henningsen-Lamesa expressed enthusiasm for the process.
- Q: What does it cost to pasteurize?
- A: It was stated that 1/2¢ per pound of liquid egg more than covered the cost, but no accurate estimates were available. It was stated, however, that such estimates might become available soon as a result of studies now under way by industry. Evidently cost is not a serious deterrent to pasteurization.
- Q: Is there any other way than pasteurization to eliminate Salmonella?
- A: In response to Dr. Carpenter's specific mention of antibiotics for this purpose, Dr. Lineweaver stated that he considers it unlikely that antibiotics will be found to be of practical value for this purpose. Antiseptics such as chlorine and hydrogen peroxide, if their use is permitted, at present appear to be a more probable approach. Pasteurization is the only procedure thus far established as a practical means of destroying Salmonella in liquid whole egg and egg yolk.
- Q: Is it possible, though perhaps not practical, to make an all-purpose dried white?
- A: A need for an all-purpose white was not evident from the comments made.
- Q: What is the relative importance of microbial and nonmicrobial shell egg deterioration?
- A: Non-microbial deterioration is much more important. This emphasizes the need for a better understanding of the mechanism of non-microbial deterioration.
- Q: Does flash heating of eggs, especially immediately following washing, have any possibilities?
- A: Dr. Stewart thinks that this process has possibilities and that the washing of eggs still has some economic advantages. Dr. Koonz feels that flash heating is less effective than a lower temperature over a longer period of time. Dr. Feeney outlined recent experimental work at Albany on passing the eggs rapidly through a flame.
- Q: Does the composition of the warehouse atmosphere affect the stability of stored eggs?

- A: Mr. Diehl said, "Yes", and described a project at Purdue relative to volatile odors such as fruit emanations, etc. The Western Regional Research Laboratory is particularly interested in the effect of chemicals with reducing action (such as hydrogen sulfide or sulfur dioxide) in the atmosphere on egg quality (inadequate ozone controls, etc.). No information on the latter was offered by industry.
- Q: Are there any deleterious effects from oiling eggs?
- A: Dr. Stewart: Pin-spot mold; results are generally considered satisfactory, however.
- Q: What sort of standards, if any, are needed for frozen eggs and what kind of research is needed to establish them?
- A: It was generally agreed that the latter is the more important phase of this question and that frozen-egg standards are influenced by user's preference. The advisability of appointing an industry committee to consider this was discussed. It was recognized that the Poultry Branch of PMA is giving consideration to this problem.
- Q: What is wrong with concentrated egg?
- A: Perhaps nothing, but functionally it seems less desirable than frozen or dried. Its advantages are not clear-cut.
- Q: What problems are encountered by industry in the disposition of inedible egg products, especially technical albumin?
- A: No problems were mentioned, perhaps largely because there is presently a brisk demand for inedible egg white.

Dr. Slosberg inquired about the cooperative experiment now under way with the Quartermaster Food and Container Institute on the comparison of acidified and fermented dried whole egg. Since no samples had been removed from storage, there was nothing to report.

Discussion of Questions on Poultry

- Q: Should in-plant chlorination be used, and how much is it used?
- A: Dr. Carpenter indicated that its use is rather broad. Two parts per million are used on the line and five parts per million are used for clean-up purposes. Dr. Koonz questioned whether chlorination is necessary when good housekeeping practices are followed.
- Q: Is there a health hazard in the distribution of fresh cut-up poultry?
- A: It was agreed that there is no evidence of sickness traceable thereto.

- Q: Is Staphylococcal enterotoxin a recognized problem in poultry, especially turkeys?
- A: Dr. Carpenter submitted that "food poisoning" from turkey is usually associated with mixtures of turkey with other food items.
- Q: Newcastle in humans?
- A: This is apparently limited to laboratory workers handling the live virus. The infection is characterized as a mild form of eye infection. Dr. Carpenter said that the Institute is endeavoring to set up procedures under which it would be safe to ship poultry to the British Isles for U. S. Army consumption; (it is currently banned on the basis of Newcastle quarantines).
- Q: Are hormonized birds preferred in comparison with their sisters?
- A: Chemically hormonized or capetted poultry was discussed from two standpoints: the public health hazard involved in injecting the synthetic female sex hormone, diethylstilbesterol, in the head of the bird; and the actual value derived from the hormone in terms of appearance and eating quality. Dr. Lorenz stated that the quantity of diethylstilbesterol which the consumer could possibly get by eating capetted birds is so minute that it does not constitute a hazard. On the other hand, Dr. Koonz pointed out the legal risk, since medical authorities might testify to the potential harmful effects of ingesting stilbesterol. In regard to evaluation of the beneficial effects of capet ing, there were no objective data offered on improvement in eating quality. Dr. Carpenter pointed to the tremendous growth of the practice of hormonizing; he gave the following figures: In 1949, approximately 25 million birds were capetted; in 1950, 50 million; and in 1951, an estimated 75 to 100 million.
- Q: The questions related to MSG and poultry flavor.
- A: Dr. Howe discussed the possible role of monosodium glutamate in poultry flavor. On the basis of present information, there is a question whether MSG increases or accentuates natural poultry flavor significantly. It is apparent that additional objective data are needed to settle this question. On the other hand, there can be little question that MSG has a favorable effect on various foods.
- Q: What information is available from industry (and the literature) on the actual force required to pull out feathers of birds scalded at 126 and 140°, compared with unscalded birds?
- A: Mr. Keith, of Seymour Packing Company, contributed information on the present status of feather picking in the form of a letter from Harry Drews, prominent consultant on poultry processing. Mr. Drews knew of no dependable data on the force required to pull feathers under various processing conditions and he stated that there was need for "factual and nonprejudiced answers" for such specific problems in poultry dressing.

In regard to the effect of scalding temperatures on poultry meat quality, a need was expressed for the study of 138° F. scalding temperature in comparison with 128° F. and lower temperatures. This type of work has been initiated at WRRL during the past year. The QMF&CI are interested in this problem and are sponsoring commercial scale research on the comparative keeping quality of birds scalded at 138° F. and 128° F.

Addendum

Research Programs on Poultry and Egg Processing and Utilization at WRRL* (1950-1951)

1. The relation of fat composition to rancidity development in frozen poultry.
2. Characterization of rancidity development in poultry as influenced by packaging, antioxidants and dressing procedures.
3. Basic investigation of factors involved in feather removal.
4. Elimination of rancidity and other deficiencies in precooked frozen poultry products such as turkey a la king (RMA).
5. Determination of the incidence and significance of Salmonella and other pathogens as they occur at various stages of the poultry processing line (RMA Contract)*.
6. Improvement of methods for detecting and counting Salmonella in eggs and egg products (RMA Contract)*.
7. Determination of the thermal death times of several strains of Salmonella (RMA).
8. The characterization and study of the individual components of egg white in relation to their usefulness in medicine (not currently active).
9. The relation of the components of egg white to the properties of eggs.
10. Fundamental and applied studies on frozen and dried egg white.
11. Determination of the mechanism by which freezing causes egg yolk to become so viscous that it is difficult to handle (not currently active).
12. Determination of the cause for the development of rubberiness in cooked egg white on freezing (RMA).
13. Determination of the effect of thermostabilization (16 minutes heating near 134° F.) of shell eggs on the functional properties of the eggs and estimation of acceptability of such eggs to the consumer (RMA Contract)*.

*Items 5, 6 and 13 are being done under contracts supervised by WRRL

14. Fundamental and applied studies on dried whole egg.
15. Utilization of feathers to make fertilizer meal, bristles, etc.

Publications on Poultry and Eggs - 1950-1951

Egg Research:

SHEAR - NOT PRESSURE - HARMS EGG WHITE. MacDonnell, L. R., Hanson, H. L., Silva, R. B., Lineweaver, Hans, and Feeney, R. E. * * * Food Industries 22, 273-276 (1950).

THE ESSENTIAL GROUPS OF LYSOZYME, WITH PARTICULAR REFERENCE TO ITS REACTION WITH IODINE. Fraenkel-Conrat, H. L. * * * Arch. Biochem. 27, 109-124 (1950).

THE NUCLEIC ACID OF AVIDIN. Fraenkel-Conrat, H. L., Ward, W. H., Snell, N. S., and Ducay, E. D. * * * J.A.C.S. 72, 3826 (1950).

COMPARISON OF THE IRON BINDING ACTIVITIES OF CONALBUMIN AND OF HYDROXYLAMIDO PROTEINS. Fraenkel-Conrat, H. L. * * * Arch. Biochem. 28, 452 (1950).

THE METAL-BINDING ACTIVITY OF CONALBUMIN. Fraenkel-Conrat, H. L., and Feeney, R. E. * * * Arch. Biochem. 29, 101 (1950).

AMINO ACID COMPOSITION OF EGG PROTEINS. Lewis, J. C., Snell, N. S., Hirschmann, D. J., and Fraenkel-Conrat, H. L. * * * J. Biol. Chem. 186, 23 (1950).

ABSENCE OF GROWTH INHIBITING ACTIVITY IN TRYPSIN INHIBITOR FROM EGG WHITE. Klose, A. A., Hill, Barbara, and Fevold, H. L. * * * Arch. Biochem. 27, 364 (1950).

CHEMISTRY OF SHELL EGG DETERIORATIONS: THE DETERIORATIONS OF SEPARATED COMPONENTS. Feeney, R. E., Silva, R. B., and MacDonnell, L. R. * * * Poultry Science, in press.

CHEMISTRY OF SHELL EGG DETERIORATIONS: THE EFFECT OF REDUCING AGENTS. MacDonnell, L. R., Lineweaver, Hans, and Feeney, R. E. * * * Poultry Science, in press.

THE MOLECULAR WEIGHT OF LYSOZYME AFTER REDUCTION AND ALKYLATION OF THE DISULFIDE BONDS. Fraenkel-Conrat, H. L., Mohammed, A., Ducay, E. D., and Mecham, D. K. * * * J.A.C.S. 73, 625-627 (1951).

ROLE OF GLUCOSE IN THE STORAGE DETERIORATION OF WHOLE EGG POWDER. I. REMOVAL OF GLUCOSE FROM WHOLE EGG MELANGE BY YEAST FERMENTATION BEFORE DRYING. Kline, Leo, and Sonoda, T. T. * * * Food Technology 5 (3), 90-94 (1951).

ROLE OF GLUCOSE IN THE STORAGE DETERIORATION OF WHOLE EGG POWDER. II. A BROWNING REACTION INVOLVING GLUCOSE AND CEPHALIN IN DRIED WHOLE EGGS. Kline, Leo, Cegg, J. E., and Sonoda, T. T. * * * Food Technology 5 (5), 181-187 (1951).

ROLE OF GLUCOSE IN THE STORAGE DETERIORATION OF WHOLE EGG POWDER. III. EFFECT OF GLUCOSE REMOVAL BEFORE DRYING ON ORGANOLEPTIC, BAKING, AND CHEMICAL CHANGES. Kline, Leo, Hanson, H. L., Sonoda, T. T., Gegg, J. E., Feeney, R. E., and Lineweaver, Hans. * * * Food Technology 5, 323 (1951).

THE SULFHYDRYL GROUPS OF OVALBUMIN. MacDonnell, L. R., Silva, R. B., and Feeney, R. E. * * * Arch. Biochem. 32, 288 (1951).

THE ANTAGONISTIC ACTIVITIES OF CONALBUMIN AND 8-HYDROXYQUINOLINE (OXINE). Feeney, R. E. * * * Arch. Biochem., in press.

IMPROVING FROZEN AND DRIED EGG. Lineweaver, Hans, and Feeney, R. E. * * * Yearbook of Agriculture, 642-647 (1950-1951).

Poultry Research:

THE FREEZING PRESERVATION OF TURKEY MEAT STEAKS. Klose, A. A., Hanson, H. L., and Lineweaver, Hans. * * * Food Technology 4, 71-74 (1950).

EFFECT OF PREFREEZING HOLD TIME AND ANTIOXIDANT SPRAY ON STORAGE STABILITY OF FROZEN EVISCERATED TURKEYS. Pool, M. F., Hanson, H. L., and Klose, A. A. * * * Poultry Science, 29, 347-350 (1950).

PRODUCTION OF A FRIABLE MEAL FROM FEATHERS. Binkley, C. H., and Vasak, O. R. * * * Mimeographed Information Sheet - AIC-274 (June 1950).

THE ROLE OF DIETARY FAT IN THE QUALITY OF FRESH AND FROZEN TURKEYS. Klose, A. A., Mecchi, E. P., Hanson, H. L., and Lineweaver, Hans. * * * Journal Amer. Oil Chem. Soc. 28(4), 162-164 (1951).

ESTIMATION OF MONOCARBONYL COMPOUNDS IN RANCID FOODS. Pool, M. F., and Klose, A. A. * * * Journal Amer. Oil Chem. Soc. 28, 215-218 (1951).

EFFECT OF TIME INTERVAL BETWEEN SLAUGHTER AND EVISCERATION ON QUALITY AND STORAGE STABILITY OF TURKEYS. Klose, A. A., Mecchi, E. P., Streeter, I. V., and Hanson, H. L. * * * Poultry Science, in press.

CHEMICAL CHARACTERISTICS OF TURKEY CARCASS FAT AS A FUNCTION OF DIETARY FAT. Klose, A. A., Mecchi, E. P., Behman, G. A., and Lineweaver, Hans (WRRL) - Kratzer, F. H., and Williams, Delbert (Univ. of Calif. at Davis). * * * Poultry Science, submitted for publication.

QUALITY IN PROCESSED POULTRY. Klose A. A., Hanson, H. L., and McNally, E. H. * * * Yearbook of Agriculture, 633-641 (1950-1951).

UTILIZATION OF POULTRY WASTES. Lundgren, H. P., Lineweaver, Hans, and McNally, E. H. * * * Yearbook of Agriculture, 869-876 (1950-1951).

Research on Precooked Frozen Food and on Food Appraisal:

PREPARATION AND STORAGE OF FROZEN COOKED POULTRY AND VEGETABLES. Hanson, H. L., Winegarden, H. M., Horton, M. B., and Lineweaver, Hans. * * * Food Technology 4 (11), 430-434 (1950).

APPLICATION OF BALANCED INCOMPLETE BLOCK DESIGN TO SCORING OF TEN DRIED EGG SAMPLES. Hanson, H. L., Kline, Leo, and Lineweaver, Hans. * * * Food Technology 5 (1), 9-13 (1951).

PREPARATION OF STABLE FROZEN SAUCES AND GRAVIES. Hanson, H. L., Campbell, Agnes, and Lineweaver, Hans. * * * Food Technology, in press.

EFFECT OF ANTIOXIDANT ON RANCIDITY DEVELOPMENT IN FROZEN CREAMED TURKEY. Lineweaver, Hans, Anderson, J. D., and Hanson, H. L. * * * Food Technology, submitted for publication.

Microbiological Research:

(By Microbiology Division - Formerly at Beltsville)

THE UTILIZATION OF SOME ORGANIC COMPOUNDS BY ONE STRAIN EACH OF SALMONELLA ANATUM, SALMONELLA ORANIENBURG, AND SALMONELLA PULLORUM. Davis, F. and Solowey, M. * * * J. Bact. 59, 361 (1950).

RESTING CELL FERMENTATION OF EGG WHITE BY STREPTOCOCCI. Kaplan, A. M., Solowey, M., Osborne, W. W., and Tubiash, H. * * * Food Technology 4, 474 (1950).

THE PRESENCE OF ENTEROCOCCI IN SPRAY-Dried Whole Egg Powder, Solowey, M. and Watson, A. J. * * * Food Research 16, 187 (1951).

THE PROBLEM OF BACTERIA IN EGGS. Solowey, M. * * * Yearbook of Agriculture 650-652 (1950-1951).

EXPERIMENTAL HUMAN SALMONELLOSIS^{1/}. I. PATHOGENICITY OF STRAINS OF SALMONELLA MELEAGRIDIS AND SALMONELLA ANATUM OBTAINED FROM SPRAY-DRIED WHOLE EGG. McCullough, Norman B. and Eisele, C. W. * * * J. Infect. Dis. 88, 278 (1951).

EXPERIMENTAL HUMAN SALMONELLOSIS^{1/}. II. IMMUNITY STUDIES FOLLOWING EXPERIMENTAL ILLNESS WITH SALMONELLA MELEAGRIDIS AND SALMONELLA ANATUM. McCullough, N. B. and Eisele, C. W. * * * J. Immunology 66, 595 (1951).

EXPERIMENTAL HUMAN SALMONELLOSIS^{1/}. III. PATHOGENICITY OF STRAINS OF SALMONELLA NEWPORT, SALMONELLA DERBY, AND SALMONELLA BAREILLY OBTAINED FROM SPRAY-DRIED WHOLE EGG. McCullough, N. B. and Eisele, C. W. * * * J. Infect. Dis., in press.

EXPERIMENTAL HUMAN SALMONELLOSIS^{1/}. IV. PATHOGENICITY OF STRAINS OF SALMONELLA PULLORUM OBTAINED FROM SPRAY-DRIED WHOLE EGG. McCullough, N. B. and Eisele, C. W. * * * J. Infect. Dis., in press.

^{1/}
- Work done under contract at the University of Chicago.

RELATIVE PATHOGENICITY OF CERTAIN SALMONELLA STRAINS FOR MAN AND MICE^{1/}.
McCullough, N. B. * * * In press.

RELATIVE EFFICIENCY OF DIFFERENT CULTURE MEDIA IN ISOLATION OF CERTAIN
MEMBERS OF THE SALMONELLA GROUP^{1/}. McCullough, N. B. and Byrne, A. F.
* * * In press.

^{1/} Work done under contract at the University of Chicago.

